

C.) REMARKS

This Response is filed in response to the Final Office Action dated January 12, 2007 and Advisory Action mailed April 17, 2007.

Upon entry of this Response, claims 13-19 will be pending in the Application.

In the outstanding Office Action, the Examiner rejected claims 13-18 under 35 U.S.C. § 103(a) as being unpatentable over Luthra et al. (Melt Infiltrated (MI) SiC/SiC Composites for Gas Turbine Applications), hereinafter "Luthra" in view of Park (U.S. Patent No. 3,925,587), hereinafter "Park", Corman et al. (U.S. Patent No. 5,952,100), hereinafter "Corman", and Handbook of Composites, 2nd Edition, hereinafter "Handbook"; rejected claim 19 under 35 U.S.C. § 103(a) as being unpatentable over Luthra in view of Handbook.

Claims 13 and 19 have been amended to claim "rotatable components" and "wherein normal engine operation includes rotation of the rotatable turbine engine component". Support for these amendments can be found, *inter alia*, in paragraphs [0005], [0034] and [0036] of the present specification.

Rejection under 35 U.S.C. 103

The Examiner rejected claims 13-18 under 35 U.S.C. § 103(a) as being unpatentable over Luthra in view of Park, Corbin and Handbook.

Applicants incorporate the arguments and discussion provided in the Response filed October 23, 2007.

In response to Applicant's previous Response, the Examiner dismissed Applicant's arguments stating the following:

A. Applicant argues that Luthra teaches away from turbine blade components. The examiner acknowledges the passage of Luthra cited by applicant, but it is the examiner's position that this section only serves as specific motivation to increase the strength of the component according to the secondary reference(s). Consequently, this argument is not persuasive.

Applicant traverses the rejection and disagrees with the Examiner's position that the cited portion of the Luthra reference includes merely a specific motivation to increase the strength of the component according to the secondary reference.

Specifically, as recited in the previous Response, Luthra states the following:

"The stress capability of current CMCs is limited, and hence their applications would be limited to stationary components, such as shrouds, combustors, transition pieces, and nozzles or vanes. **Rotating blade/bucket components require much higher stresses than are currently possible with CMCs.**" (emphasis added)

The Examiner has dismissed this section, stating that the secondary reference allegedly motivate "increased strength". However, as a close read to the Luthra reference will reveal, Luthra suggests that CMCs are unsuitable for use with "rotating blade/bucket components", as instantly claimed. The inventors of the present application have solved this problem, *inter alia*, by providing "a preselected number of the plurality of biased plies are oriented such that the orientation of the first warp direction of a preselected number of the plurality of biased plies lie about in the direction of maximum tensile stress during normal engine operation, wherein normal engine operation includes rotation of the rotatable turbine engine component" (claim 13). The inventors have solved the problem set forth in Luthra, wherein a particular configuration of CMC, as instantly claimed, permits the fabrication of rotating turbine engine components. The Examiner utilizes secondary references to piece together portions of the claim, but even this combination does not suggest the solution claimed, enabling one of ordinary skill in the art to fabricate CMC rotating turbine engine components.

As recited in MPEP 2145(X)(D)(3), "the totality of the prior art must be considered, and **proceeding contrary to accepted wisdom in the art is evidence of nonobviousness.** *In re Hedges*, 783 F.2d 1038, 228 USPQ 685 (Fed. Cir. 1986) [Emphasis added]. Furthermore, "[k]nown disadvantages in old devices which would naturally discourage search for new inventions may be taken into account in determining obviousness." *United States v. Adams*, 383 U.S. 39, 52, 148 USPQ 479, 484 (1966). In this instance, we have a clear teaching in Luthra that CMCs were considered not "currently possible with CMCs". Therefore, the passage of Luthra not only teaches away from the cited combination, the citation provide evidence of non-

obviousness, see MPEP 2145. Therefore, the claims are non-obvious over the prior art and are therefore allowable.

Applicant traverses the Examiner's application and response to Applicant's argument utilizing Park as a secondary reference. The Examiner further states the following:

B. Applicant argues that Park is limited to polymeric matrix composites and not ceramic matrix composites. The examiner acknowledges this, but the test of obviousness is not that the references be physically combinable, but what the references taken as a whole would have suggested to one of ordinary skill. In the instant case, the teaching of Park with respect to the warp and weft tows is equally applicable where said tows are impregnated with a polymer or a ceramic. Consequently, this argument is not persuasive. This applies also to applicant's argument bridging pages 11-12 of the remarks.

The Examiner's position is based on impermissible hindsight. The Examiner admits that Park is drawn to polymeric matrix composites and not ceramic matrix composites, but dismisses the difference simply because Park allegedly suggests an arrangement of tows. There is no suggestion or motivation in Park to arrange the tows (i.e., tows for use in a polymeric matrix) in any manner suitable for use in a gas turbine engine component as instantly claimed. For example, Examiner states that "Park discloses a woven fabric suitable for use in the formation of a carbon composite having a fewer number of weft tows than warp tows, which imparts tensile strength to the fabric in the longitudinal direction". The tensile strength and arrangement is not suitable for use in turbine engine, as claimed, because, as such, the structures of Park would disintegrate, vaporize and/or tear apart in the conditions of a turbine engine. Park does not teach, suggest or consider any of the conditions present in the gas turbine engine and therefore, a mere passing mention of tensile strength does not suggest to one of ordinary skill in the art that such an arrangement with or without matrix material is suitable for use in a gas turbine engine. Therefore, the suggestion of improved tensile strength of Park has no bearing or suggestion

relating to the fabrication of the gas turbine engine components. Furthermore, even if the combination was made, as taught in Luthra, such a combination would not be suitable for ceramic material (CMCs). The Examiner is utilizing the broad teachings of a small portion of Park and ignoring both the teachings of Park and Luthra, each independently taken as a whole. Thus, Applicant respectfully submits that the Examiner has improperly combined the references.

Applicant traverses the Examiner's application and response to Applicant's argument utilizing Handbook as a secondary reference. The Examiner further states the following:

C. Similarly, with respect to the Handbook reference, the test of obviousness is not that the references be physically combinable, but what the references taken as a whole would have suggested to one of ordinary skill. In the instant case, the teaching of Handbook with respect to orientation of the plies is equally applicable where said tows are impregnated with a polymer or a ceramic. Consequently, this argument is not persuasive.

As discussed above with respect to Park, the Examiner is utilizing impermissible hindsight with respect to Handbook to reconstruct the present invention. The Examiner admits that Handbook is drawn to polymeric matrix composites and not ceramic matrix composites, but dismisses the difference simply because Handbook allegedly suggests an arrangement of plies. There is no teaching in Handbook that teaches or suggests "a preselected number of the plurality of biased plies are oriented such that the orientation of the first warp direction of a preselected number of the plurality of biased plies lie about in the direction of maximum tensile stress during normal engine operation, wherein normal engine operation includes rotation of the rotatable turbine engine component" (claim 13). Examiner cites Handbook as teaching that it is known in the art of ceramic composites to arrange/orient plies in the component to impart a desired elastic strength. However, the citation to page 321 by the Examiner in Handbook does not teach ceramic matrix composites, but rather is limited to polymer matrix composites. As one of ordinary skill in the art will appreciate, the properties, manufacture and the problems associated

with ceramic matrix composites are not the same as the properties, manufacture and the problems associated with polymer matrix composites. For example, polymer matrix composites cannot be utilized at temperatures (specification: paragraph [0004]) or conditions (specification: paragraph [0009]) present in the turbine section of a gas turbine engine and are unsuitable for these gas turbine engine components, wherein the polymer matrix of Park and/or Handbook would volatilize and/or fail. Therefore, the suggestion of desired elastic strength of Handbook has no bearing or suggestion relating to the fabrication of the gas turbine engine components. Furthermore, even if the combination was made, as taught in Luthra, such a combination would not be suitable for ceramic material (CMCs). The Examiner is utilizing the broad teachings of a small portion of Handbook and ignoring both the teachings of Park and Luthra, each independently taken as a whole. Thus, Applicant respectfully submits that the Examiner has improperly combined the references.

Applicant traverses the Examiner's application and response to Applicant's argument utilizing Corman as a secondary reference. The Examiner further states the following:

D. With respect to Corman, this reference teaches that the claimed compounds are art-recognized as suitable for achieving the claimed purpose.

See MPEP 2144.07. Consequently, this argument is not persuasive.

As stated in the previous response, Corman is utilized by the Examiner to teach the infiltration of the BN and SiC. However, the Examiner does not provide any evidence in either Corman, nor Luthra establishing that one of ordinary skill in the art would modify Luthra in the manner described by the Examiner. The mere statement that it is known in the art as suitable is insufficient to motivate one of ordinary skill in the art to modify Luthra.

Applicant submits that dependent claims 14-18 are distinguishable from Luthra, Park, Corman and/or Handbook for at least the following reasons. Dependent claims 14-18 are believed to be distinguishable from Luthra, Park, Corman and/or Handbook as depending from what are believed to be allowable independent claim 13 as discussed above.

The Examiner rejected claim 19 under 35 U.S.C. § 103(a) as being unpatentable over Luthra in view of Handbook.

Claim 19 is distinguishable from Luthra, and/or Handbook for at least the reasons set forth above with the discussion of the rejection of claims 13-18. Likewise, as discussed above, the Examiner has improperly combined the teachings of Luthra and Handbook. It is further noted that the level of robustness of the teaching of the prior art is insufficient to render the manufacture of the specific component claimed without a teaching or suggestion therein to method of manufacturing the specific components. Therefore, Applicant respectfully requests withdrawal of the rejection of claim 19.

CONCLUSION

In view of the above, Applicant respectfully requests reconsideration of the Application and withdrawal of the outstanding objections and rejections. As a result of the amendments and remarks presented herein, Applicant respectfully submits that claims 13-19 are not anticipated by nor rendered obvious by Luthra, Park, Corman, Handbook or their combination and thus, are in condition for allowance. As the claims are not anticipated by nor rendered obvious in view of the applied art, Applicant requests allowance of claims 13-19 in a timely manner. If the Examiner believes that prosecution of this Application could be expedited by a telephone conference, the Examiner is encouraged to contact the Applicant.

The Commissioner is hereby authorized to charge any additional fees and credit any overpayments to Deposit Account No. 50-1059.

Respectfully submitted,
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